preferably from 7% by weight to about 25% by weight hemicellulose, more preferably from 7% by weight to about 20% by weight hemicellulose, most preferably from about 10% by weight to about 17% by weight hemicellulose, and cellulose having an average D.P. of from about 200 to about 1100, preferably from about 300 to about 1100, and more preferably from about 400 to about 700. A presently preferred composition of the present invention has a hemicellulose content of from about 10% by weight to about 17% by weight, and contains cellulose having an average D.P. of from about 400 to about 700. Hemicellulose content is measured by a sugar content assay based on TAPPI Standard T249 hm-85. Further, compositions of the present invention preferably have a kappa number of less than 2, preferably less than 1. Most preferably compositions of the present invention contain no detectable lignin. Lignin content is measured using TAPPI Test T236 cm—85.

Compositions of the present invention preferably have a unimodal distribution of cellulose D.P. values wherein the individual D.P. values are approximately normally distributed around a single, modal D.P. value, *i.e.*, the modal D.P. value being the D.P. value that occurs most frequently within the distribution. The distribution of cellulose D.P. values may, however, be multimodal *i.e.*, a distribution of cellulose D.P. values that has several relative maxima. A multimodal, treated pulp of the present invention might be formed, for example, by mixing two or more unimodal, treated pulps of the present invention that each have a different modal D.P. value. The distribution of cellulose D.P. values is determined by means of proprietary assays performed by Thuringisches Institut fur Textil-und Kunstoff Forschunge. V., Breitscheidstr. 97, D-07407 Rudolstadt, Germany.

Compositions of the present invention which have been treated to reduce their D.P. without substantially reducing the hemicellulose content of the pulp, exhibit a desirably narrow molecular weight distribution as evidenced by a differential between R_{10} and R_{18} values (ΔR) of less than about 2.8, preferably less than about 2.0 and most preferably less than about 1.5.

Additionally, compositions of the present invention preferably have a relatively low carbonyl content as evidenced by a copper number of less than about 2.0, more preferably less than about 1.1, most preferably less than about 0.8 as measured by TAPPI Standard T430. Further, compositions of the present invention preferably have

a carbonyl content of less than about 60 μmol/g and a carboxyl content of less than about 60 μmol/g, more preferably, a carbonyl content less than 30 μmol/g and a carboxyl content less than about 30 μmol/g. The carboxyl and carbonyl group content are measured by means of proprietary assays performed by Thuringisches Institut fur Textil-und Kunstoff Forschunge. V., Breitscheidstr. 97, D-07407 Rudolstadt, Germany, referred to below as TITK.

Compositions of the present invention also preferably possess a low transition metal content. Preferably, the total transition metal content of the compositions of the present invention is less than 20 ppm, more preferably less than 5 ppm, as measured by Weyerhaeuser Test Number AM5-PULP-1/6010. The term "total transition metal content" refers to the combined amounts, measured in units of parts per million (ppm), of nickel, chromium, manganese, iron and copper. Preferably the iron content of the compositions of the present invention is less than 4 ppm, more preferably less than 2 ppm, as measured by Weyerhaeuser Test AM5-PULP-1/6010, and the copper content of the compositions of the present invention is preferably less than 1.0 ppm, more preferably less than 0.5 ppm, as measured by Weyerhaeuser Test AM5-PULP-1/6010.

Compositions of the present invention are readily soluble in amine oxides, including tertiary amine oxides such as NMMO. Other preferred solvents that can be mixed with NMMO, or another tertiary amine solvent, include dimethylsulfoxide (D.M.S.O.), dimethylacetamide (D.M.A.C.), dimethylformamide (D.M.F.) and caprolactan derivatives. Preferably, compositions of the present invention fully dissolve in NMMO in less than about 70 minutes, preferably less than about 20 minutes, utilizing the dissolution procedure described in Example 11 below. The term "fully dissolve", when used in this context, means that substantially no undissolved particles are seen when a dope, formed by dissolving compositions of the present invention in NMMO, is viewed under a light microscope at a magnification of 40X to 70X.

A first preferred embodiment of the treated pulp of the present invention is a treated Kraft pulp including at least 7% by weight hemicellulose, a copper number less than about 2.0, cellulose having an average degree of polymerization of from about 200 to about 1100, and a ΔR less than about 2.8.

A second preferred embodiment of the treated pulp of the present invention is a treated Kraft pulp including at least 7% by weight hemicellulose, a copper number less than two, cellulose having an average degree of polymerization of from about 200 to about 1100, the individual D.P. values of the cellulose being distributed unimodally, and a ΔR less than about 2.8.

A third preferred embodiment of the treated pulp of the present invention is a treated Kraft pulp including at least 7% by weight hemicellulose, cellulose having an average degree of polymerization of from about 200 to about 1100, a kappa number less than two, a copper number less than 0.8, and a ΔR less than about 2.8.

Lyocell fibers formed from compositions of the present invention include at least about 5% by weight hemicellulose, preferably from about 5% by weight to about 22% by weight hemicellulose, more preferably from about 5% by weight to about 18% by weight hemicellulose, most preferably from about 10% by weight to about 15% by weight hemicellulose, cellulose having an average D.P. of from about 200 to about 1100, more preferably from about 300 to about 1100, most preferably from about 400 to about 700, and a lignin content providing a kappa number less than about 2.0 and more preferably less than about 1.0. Additionally, preferred lyocell fibers of the present invention have a unimodal distribution of cellulose D.P. values, although lyocell fibers of the present invention may also have a multimodal distribution of cellulose D.P. values, *i.e.*, a distribution of cellulose D.P. values that has several relative maxima. Lyocell fibers of the present invention having a multimodal distribution of cellulose D.P. values might be formed, for example, from a mixture of two or more unimodal, treated pulps of the present invention that each have a different modal D.P. value.

Preferred lyocell fibers of the present invention have a copper number of less than about 2.0, more preferably less than about 1.1, most preferably less than about 0.8 as measured by TAPPI Standard T430. Further, preferred lyocell fibers of the present invention have a carbonyl content of less than about 60 μmol/g and a carboxyl content of less than about 60 μmol/g, more preferably a carbonyl content less than about 30 μmol/g and a carboxyl content of less than about 30 μmol/g. The carboxyl and carbonyl group content are measured by means of proprietary assays performed by Thuringisches Institut fur Textil-und Kunstoff Forschunge. V., Breitscheidstr. 97, D—07407 Rudolstadt, Germany. Additionally, preferred lyocell fibers of the present